

CLAIMS:

1. A process for casting a metal artefact by forming a molten charge of metal from a precursor thereof, charging a die or mould with the molten charge to fill the die or mould sufficiently to form a single metal artefact and causing or allowing the charge to solidify in the die or mould to form the artefact, the process being characterized in that

it includes the step of selecting the size of the molten charge to match the capacity of the die or mould so that the charging of the die or mould consumes substantially the whole molten charge.

2. A process as claimed in Claim 1, characterized in that forming the molten charge is from a precursor thereof which is a metal billet or ingot or a compact of metal particles.

3. A process as claimed in Claim 1 or Claim 2, characterized in that it includes heating the metal of the molten charge, after forming the molten charge, to raise the temperature of the molten charge, prior to filling the die or mould with the molten charge at the raised temperature.

4. A process as claimed in any one of Claims 1 – 3 inclusive, characterized in that the charging is carried out by injection moulding at an intermediate pressure in the range 50 KPa - 30MPa.

5. A process as claimed in any one of the preceding claims, characterized in that it includes the step of purging the environment in which the molten charge is formed with a purging gas, prior to and during the forming of the molten charge.

5 6. A process as claimed in any one of the preceding claims, characterized in that it includes using, as the metal, a metal selected from the group consisting of aluminium, magnesium, lithium, zinc and alloys thereof.

7. A process as claimed in Claim 6, characterized in that it includes using, as the
10 metal, a light metal selected from the group consisting of magnesium, aluminium and alloys thereof.

8. A process as claimed in Claim 7, characterized in that the casting is of a light metal artefact in the form of a motor vehicle wheel rim.

15

9. A process as claimed in any one of the preceding claims, characterized in that the casting is of a metal artefact in which all the parts of the solidified artefact are spaced from the closest part of the surface of the artefact by a spacing of 0.75 – 15mm, the artefact having a mass of 0.25 – 30 kg.

20

10. A casting apparatus or installation (50) for casting a metal artefact in a die or mould, the casting apparatus or installation including a die or mould (54) and a melting apparatus (10) which includes a container (12) for holding a precursor of a molten charge of metal, a heating arrangement (16) for heating the precursor in the
25 container to form a molten charge of metal, and a molten metal transfer assembly

(20) for transferring a molten charge of metal from the container to the die or mould, the casting apparatus or installation being characterized in that

the container and die or mould have capacities which are matched so that charging
5 of the die or mould from the container to fill the die or mould with a charge sufficient to form a single metal artefact consumes substantially the whole charge of molten metal from the container and leaves the container empty.

11. An apparatus or installation as claimed in Claim 10, characterized in that the
10 heating arrangement is mounted on the molten metal transfer assembly.

12. An apparatus or installation as claimed in Claim 10 or Claim 11, characterized in that the melting apparatus is reciprocable relative to the die or mould between a charging position where charging of the melting apparatus takes place and a filling
15 position where transfer of a molten charge from the melting apparatus to the die or mould takes place.

13. An apparatus or installation as claimed in any one of Claims 10 -12 inclusive, characterized in that it includes an inert gas supply (22) for supplying inert gas to the
20 container, to permit forming of the molten charge to take place under an inert atmosphere.

14. An apparatus or installation as claimed in any one of Claims 10 -13 inclusive, characterized in that the container has a hollow cylindrical interior.

15. An apparatus as claimed in any one of Claims 10 -14 inclusive, characterized in that the container is a hollow cylinder or sleeve (14), the transfer assembly being a telescopic piston arrangement (24) for elevating the cylinder or sleeve into engagement with the die or mould and into communication with a charging opening
5 (62) in the die or mould.

16. An apparatus or installation as claimed in Claim 15, characterized in that the piston arrangement has a central piston (28, 30) for entering the cylinder or sleeve and for sliding upwardly therein in sealing engagement therewith, the piston
10 arrangement having a peripheral piston (37), surrounding the central piston, for urging the cylinder or sleeve upwardly into sealing engagement with the die or mould around the charging opening of the die or mould.

17. An apparatus or installation as claimed in Claim 16, characterized in that the
15 central piston has a piston head (30) provided with a sealing surface (31) for sealingly engaging the periphery of the charging opening of the die or mould.

18. An apparatus or installation as claimed in any one of Claims 10 – 17 inclusive, characterized in that the heating arrangement includes at least one induction coil
20 surrounding the container.